

MASTER OF SCIENCE IN PROGRAM MANAGEMENT

THE ROLE OF HIGH PERFORMANCE COMPUTING IN SIMULATION BASED ACQUISITION: A CASE STUDY BASED ON EXPERIENCES IN THE RAH-66 COMANCHE PROGRAM

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This thesis endeavors to determine how effective a role high performance computing played in the Program Definition and Risk Reduction (PDRR) and early Engineering and Manufacturing Development (EMD) phases of the RAH-66 Comanche Program. In so doing, the various modeling and simulation efforts used in the Comanche program are explored and their utility and efficacy determined. This study provides insights into the places to insert high performance computing into the simulation based acquisition process for best effect. In addition, it uncovers the best uses of modeling and simulation in the Comanche program, which can serve as a guide for other simulation based acquisition programs.

DoD KEY TECHNOLOGY AREAS: Air Vehicles, Computing and Software, Modeling and Simulation

KEYWORDS: RAH-66 Comanche, Simulation Based Acquisition, Modeling and Simulation, Simulation Based Design, High Performance Computing, Computer Aided Design, Computer Aided Engineering, Computer Aided Manufacturing, Virtual Prototyping, Virtual Manufacturing, Virtual Environments

A CASE STUDY OF ACQUISITION REFORM: BRIGADE COMBAT TEAM, THE VANGUARD FOR ARMY TRANSFORMATION

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This thesis is a case study of the Interim Armored Vehicle (IAV) for the US Army Brigade Combat Team (BCT) and the application of acquisition reform and accelerated acquisition. This thesis identifies the acquisition reform initiatives that were applied to develop and procure an ACAT ID major weapon system within 16 months. In 1999, the Army Chief of Staff, GEN Shinseki, stated his vision for a transformed Army that would be based on a lighter, more lethal, faster deployable, and highly mobile force that could arrive anywhere in the world within 96 hours. Centered on the procurement of six brigades of IAVs, each brigade contains a measured mix of 10 combat and combat support vehicles based on a nearly common platform. The BCT procurement of IAVs is the interim solution and is a vanguard to the Army's transformation. The culmination of the transformation will be the Objective Force, scheduled to be operational in the year 2020. The IAV procurement, therefore, was not intended as a developmental program but an integration of existing off-the-shelf capabilities that balanced cost, schedule, and

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performance in the best available vehicle system. The procurement relied on multiple acquisition reform means to accelerate the requirements development, and solicitation, to enable the delivery of the best available product to the Army. The initiatives employed to make this award form the primary research question, “What has been the impact of DoD acquisition reform on the development of the Brigade Combat Team?”

DoD KEY TECHNOLOGY AREAS: Ground Vehicles, Other (Procurement, Acquisition Reform)

KEYWORDS: Brigade Combat Team, Acquisition Reform, Interim Armored Vehicles, Medium Armored Vehicles, US Army Tank-automotive & Armaments Command, PEO – Ground Combat Support Systems, GAO Protest, Army Transformation

A SYSTEM ANALYSIS OF THE RECRUITMENT AND RETENTION PROBLEMS ASSOCIATED WITH THE PROGRAM MANAGER FOR CHEMICAL DEMILITARIZATION ORGANIZATION

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The primary purpose of this thesis is to investigate the problems of retaining qualified personnel in the Program Manager for Chemical Demilitarization organization through the end date of the program. To accomplish this the Program Manager for Chemical Demilitarization organization was analyzed from an open system prospective to identify the elements within the organization, and in the larger organizational environment, that are expected to contribute to the retention problem. In addition the current Program Manager for Chemical Demilitarization workforce demographics were examined and a survey was performed to determine relevant retention and recruitment policies for the Program Manager for Chemical Demilitarization.

DoD KEY TECHNOLOGY AREA: Manpower, Personnel, and Training

KEYWORDS: Recruitment, Retention, Organizational Analysis

SOFTWARE METRICS FOR POST DEPLOYMENT SOFTWARE SUPPORT SYSTEMS: A CASE ANALYSIS FOR THE CHEMICAL ACCOUNTABILITY MANAGEMENT INFORMATION NETWORK

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The Clinger-Cohen Act of 1996 requires performance measurement of information technology systems. Measuring the performance of program management for the Chemical Accountability Management Information Network (CAMIN) system requires a thoughtful selection of useful metrics. The CAMIN is a complex Management Information System in the post deployment software system (PDSS) phase of the system life cycle. This research uses three primary sources for candidate metrics for a PDSS like CAMIN: 1) typical software metrics from DoD and commercial applications, 2) typical fielded software system metrics from DoD and commercial applications, and 3) case analysis of metrics currently used by CAMIN and other DoD systems in the PDSS phase. Analysis of these candidate metrics creates a concise list of combined metrics that are applicable to fielded software systems. The current primary issues of CAMIN program management establish the basis for selection of appropriate program management metrics from the candidate list. These issues are examined in a process to answer the primary research question, “What are

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appropriate metrics and measures for management of the Chemical Accountability Management Information Network?”

DoD KEY TECHNOLOGY AREA: Computing and Software

KEYWORDS: Software, Metrics, PDSS, Program Management, Life Cycle, Acquisition, CAMIN

A DOD CONUNDRUM: THE HANDLING OF FEDERAL RETAIL EXCISE TAX ON THE ARMY’S MEDIUM AND HEAVY TRUCK FLEET

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This thesis explores the genesis of a Federal excise tax known as, FEDERAL RETAIL EXCISE TAX (FRET), and its impact on the acquisition of Medium and Heavy Tactical Wheeled Vehicles by the US Army and its sister Services. The thesis examines how DOD is impacted by the payment of this tax to the Department of the Treasury, through the IRS, and it reviews and discusses the direct cost, lost opportunity costs, and administrative burden to both DOD and its wheeled vehicle manufacturers. DOD payment of FRET to its contractors is in actuality the payment by one Government agency, the Army, to another Government agency, the IRS, through a third party, the defense contractor; who is considered by the IRS to be the taxpayer of record. As a result of this “three party” arrangement, no feedback mechanism exists between the Army and the IRS to verify actual payments, or for the Army to discuss and mitigate tax issues directly with the IRS. This situation is examined by addressing the primary research question: “What is the cost to the Government, both monetary and otherwise, of the Army paying FRET to the IRS, through third party defense contractors?”

DoD KEY TECHNOLOGY AREAS: Ground Vehicles, Other (Procurement)

KEYWORDS: Federal Retail Excise Tax, Medium & Heavy Tactical Wheeled Vehicles, US Army Tank-automotive & Armaments Command

DEPARTMENT OF DEFENSE (DoD) AND INDUSTRY—A HEALTHY ALLIANCE

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This thesis explores the various practices and programs available throughout DoD to leverage resources and technology with industry. The collaborative methods of dual use technology and technology transfer and the contractual instruments that enable these methods and programs are discussed and evaluated where sufficient evidence permits. The most important programs are the Dual Use Science and Technology (DUS&T), Commercial Operations and Support Savings Initiatives (COSSI), Small Business Innovation Research (SBIR), Cooperative Research and Development Agreement (CRADA), and Technology Transfer. Innovation and collaboration between public and private industries are explored throughout the thesis with a focus on research and development. There is a lack of data needed to assess the effectiveness of these practices and programs.

DoD KEY TECHNOLOGY AREA: Manufacturing Science and Technology

KEYWORDS: Science, Technology, Technology Transfer, Dual Use, Small Business Innovation Research, Cooperative Research and Development

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ANALYSIS OF CHEMICAL AGENT RESISTANT COATING (CARC) AND CHEMICAL DECONTAMINATION DOCTRINE IN RELATION TO TACTICAL WHEELED VEHICLES (TWV)

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By Army policy, all tactical wheeled vehicles are painted with Chemical Agent Resistant Coating (CARC) with the implied mission of Force Protection by providing for effective decontamination and subsequent unprotected use of chemically contaminated systems. CARC has proven to be difficult to effectively apply in typical manufacturing operations, are toxic even in dry film, and fail to provide corrosion protection to the substrate metals. All of those issues may be tolerable if the CARC system provided an effective means for decontaminating and therefore, protection of the force, but CARC does not and cannot provide for effective TWV decontamination. The design, construction and materials used in manufacturing TWVs make them costly and highly impractical, if not impossible to effectively decontaminate.

The associated cost of CARC in manufacturing, maintaining against corrosion, and early retirement of TWVs due to substrate failure is enormous and incalculable. Given the ineffectiveness of decontamination efforts on any TWV, whether or not they are painted with CARC, the Army may have nothing to lose in Force Protection and may reap significant cost avoidance by eliminating the requirement for CARC on TWVs and exploring more effective coatings that would reduce initial cost, be maintainable, and provide superior corrosion resistance for the over 200,000 tactical wheeled vehicles maintained in its fleets.

DoD KEY TECHNOLOGY AREAS: Chemical and Biological Defense, Ground Vehicles

KEYWORDS: CARC, Decontamination, Contaminates, Tactical Wheeled Vehicles, Chemical Doctrine

WINDOWS IN THE CEILING: LEADERSHIP ADVICE AND STRATEGIES FROM SUCCESSFUL FEMALE EXECUTIVES

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This thesis provides a framework for understanding specific strategies and personal characteristics women can utilize to enable them to reach the top levels of an organization. In order to do so, current literature was reviewed that was written primarily from a female perspective, and civilian women in high-grade positions working for the Army were interviewed to obtain their own personal strategies, personal characteristics, an opinions regarding the glass-ceiling concept and how to achieve success. The goal is to help break down the invisible barriers to success (or glass-ceiling) and help women achieve the success they desire. In a world where powerful corporate women are still comparatively rare, women's success stories are welcome.

DoD KEY TECHNOLOGY AREA: Manpower, Personnel, and Training

KEYWORDS: Leadership, Leadership Strategies, Personal Characteristics, Women in Leadership

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A BUSINESS CASE FOR USING MODELING AND SIMULATION IN DEVELOPMENTAL TESTING

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Modeling and Simulation (M&S) technology uses models to develop data as a basis for making managerial or technical decisions. M&S can be a valuable tool for decision-makers but it is usually under used. The United States Army Developmental Test Command (DTC) is leveraging M&S to accomplish its missions through the Virtual Proving Ground (VPG) Program. DTC supplies a customer decision-maker, usually a Program Manager (PM), with data on the cost-effectiveness of new virtual and physical test technologies in order to plan test activities. DTC requires a methodology to develop a business plan that supports the use of M&S and to provide a cost benefit analysis of particular virtual test capabilities. DTC commissioned independent studies of past test programs to estimate the costs to achieve the same scope of testing, as tested using available virtual test techniques and as using previous, less VPG-intensive test methodologies. The studies showed that virtual testing provided significant cost benefits to each PM. An objective is to examine cost avoidance results from those studies and additional data with a methodology consistent with current cost estimation guidance to determine a return on investment relationship. This thesis will endeavor to establish an equitable methodology for accounting or realizing the direct benefits associated with using M&S in testing. The details of the steps will be developed as necessary to perform a business case analysis.

DoD KEY TECHNOLOGY AREAS: Modeling and Simulation, Chemical and Biological Defense, Command, Control and Communications, Computing and Software, Conventional Weapons, Ground Vehicles

KEYWORDS: Modeling and Simulation, Simulation Based Acquisition, Virtual Proving Ground, Developmental Testing, Testing, Business Case, Cost Benefit Analysis, Cost Avoidance, Cost Savings, Return On Investment

